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Abstract Submitted
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THE FIRST OBSERVATION OF THE BCC PHASE IN COMPRESSED ALUMINUM[1] DANAE POLSIN, T. BOEHLY, G. COLLINS, J. RYGG, S. BURNS, J. DELETTREZ, M. GREGOR, B. HENDERSON, University of Rochester Laboratory for Laser Energetics, D. FRATANDUONO, R. SMITH, R. KRAUS, J. EGGERT, A. JENEI, D. SWIFT, F. COPPARI, P. CELLIERS, Lawrence Livermore National Laboratory, C. MCCOY, Sandia National Laboratory — Ramp compression is used to near isentropically compress Aluminum samples to pressures up to 600 GPa and at temperatures below the melt. Nanosecond in situ X-ray diffraction is performed at University of Rochester's Laboratory for Laser Energetics and the National Ignition Facility to directly measure the crystal structure at pressures where fcc-hcp and hcp-bcc phase transformations of Al exist. Velocimetry provided the pressure in the Al. The fcc-hcp and hpc-bcc transformations are confirmed experimentally at 240 GPa and 450 GPa, respectively. This is the first experimental evidence of the bcc phase of Al and a confirmation of the fcc-hcp transition previously observed under static compression at 217 GPa. The existence of these solid-solid phase transformations confirms that these transitions occur on the order of tens of nanoseconds time scales.

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